Remarks

The Office Action dated April 1, 2005 has been carefully reviewed and the foregoing amendment has been made in consequence thereof.

Claims 1-20 and 22-24 are now pending in this application. Claim 21 has been canceled. Claims 1-20 and 22-24 stand rejected.

Claims 1, 9, 13, and 20 have been amended. No new matter has been added.

The rejection of Claims 1-12 under 35 U.S.C. § 103(a) as being unpatentable over Sigelman et al. (U.S. Patent No. 4,691,195) in view of Forsberg (U.S. Patent No. 5,317,115), and further in view of Proefke et al. (U.S. Patent No. 5,396,217) is respectfully traversed.

Sigelman et al. describe a device (10) for indicating that a refrigerator door is open. The device includes a housing (20) mounted on the refrigerator. The housing includes an on/off switch (SW1), a test switch (SW2), a delay time switch (SW3) and a sensitivity adjustment (R_3). The device also includes a transducer (30) having a capacitive sensor (32) and conductors(31) connected to circuitry in the housing. A conductive plate (33) is aligned with the capacitive sensor when the door is closed. The circuitry includes a battery (101), a sense oscillator (110) comprising two feedback connected exclusive NOR gates (111), (112),which, with a with D type flip-flop (103), produces a, square wave at point A. The Q output of the flip-flop is fed to a phase shifter (120). The phase shifter includes two RC circuits which are unbalanced when the door is closed and balanced when the door is open. The sensitivity of the device is set when the door is closed. Two waveforms, B and C are produced from waveform A. When the door is closed, waveforms B and C are out of phase. When the door is open, waveforms B and C are in phase. Waveforms B and C are fed to a discriminator (130), including two exclusive NOR gates (131), (132), to produce a waveform D. Waveform D is a series of pulses that are produced as a result in the difference of phase between waveforms B and C and thus is only produced when the door is closed. The outputs of the discriminator

and the flip-flop are then fed to a time delay determining circuit (140) which has a counter (141).

Forsberg describes a control for relay switch-on in a microwave oven. The control includes a control unit (2) having a feedback circuit (4) a relay (3) and a microprocessor (6). A reference signal (Ref) formed by a square wave pulse train of mains voltage frequency of the same phase as the mains voltage, or having a defined phase shift relative thereto is supplied to the microprocessor. The microprocessor controls the relay via a driver (5) which generates a control voltage to the relay. The control voltage is low when the relay contacts are open, meaning that the mains voltage to the high voltage transformer is interrupted. The feedback circuit receives a feedback signal that changes state from a low level to a high level when the relay contacts change from open to closed. In one embodiment, the control unit is isolated from the power current part of the microwave, and an opto-coupler is included to provide optical feedback about the position of the relay contacts to the control unit. Door status is provided either by a door switch in the current supply to the control unit or, alternatively, using the opto-coupler with a light emitting diode (D_3) and a receiving photo-transistor (T_3).

Proefke et al. describe a vehicle intrusion detection system using phase shift analysis of an airborne acoustic signal. An automotive vehicle (10) has a rear mounted speaker (18), and a forward mounted microphone (16), both of which are connected to signal processing circuit (8), which communicates with a controller (12). The signal driving the speaker is provided by the signal processing circuit, and the transduced microphone signal is provided to the circuit. Appropriate information is extracted from the signal and is communicated to the controller. The controller outputs two square wave pulsetrains, one at a calibrated first frequency and the other at a calibrated second frequency. The pulsetrains are used by a transmitter portion of the circuit to drive the speaker, and by a receiver portion of the circuit to process the signal received by the microphone. The difference in phase between the transmitted and received signals at the two frequencies provides reliable information on vehicle interior volume. By properly

selecting, in a calibration step, a first frequency for a given vehicle as the frequency experiencing a measurable change in phase between a closed, empty state and an open or occupied state, such intrusions may be diagnosed by periodically measuring phase shift in the vehicle when a vehicle security system is armed.

Applicants respectfully submit that the Section 103 rejection of the presently pending claims is not a proper rejection. As is well established, obviousness cannot be established by combining the teachings of the cited art to produce the claimed invention, absent some teaching, suggestion, or incentive supporting the combination. None of Sigelman et al., Forsberg, and Proefke et al., considered alone or in combination, describe or suggest the claimed invention. Furthermore, in contrast to the assertion within the Office Action, Applicants respectfully submit that it would not be obvious to one skilled in the art to combine Sigelman et al. with Forsberg and Proefke et al. because there is no motivation to do so found in the references themselves.

As the Federal Circuit has recognized, obviousness is not established merely by combining references having different individual elements of pending claims. *Ex parte Levengood*, 28 U.S.P.Q.2d 1300 (Bd. Pat. App. & Inter. 1993). MPEP 2143.01. Rather, there must be some suggestion, outside of Applicants' disclosure, in the prior art to combine such references, and a reasonable expectation of success must be both found in the prior art, and not based on Applicants' disclosure. *In re Vaeck*, 20 U.S.P.Q.2d 1436 (Fed. Cir. 1991).

Furthermore, it is impermissible to use the claimed invention as an instruction manual or "template" to piece together the teachings of the cited art so that the claimed invention is rendered obvious. Specifically, it is impermissible to pick and choose from any one reference only so much of it as will support a given position, to the exclusion of other parts necessary to the full appreciation of what such reference fairly suggests to one of ordinary skill in the art. The present Section 103 rejection is based on a combination of teachings selected from multiple patents in an attempt to arrive at the claimed invention. Specifically, Sigelman is cited for disclosing a device for indicating that a refrigerator door is open. Forsberg is cited for disclosing a control for a microwave oven

including an opto-coupler. Proefke is cited for disclosing a vehicle intrusion detection system that uses phase shifts in acoustic signals.

With particular regard to Proefke, Applicants respectfully traverse the assertion in the Office Action that it would have been obvious to apply the teachings of Proefke to the device of Sigelman. Proefke teaches the use of phase shift analysis in an intrusion detection system for a vehicle. The system is acoustically based and monitors the interior volume of the vehicle using a system that includes a speaker and microphone with phase shift analysis being applied to sent and received pulsetrain signals. Sigelman, by contrast, discloses a device that includes a conductive plate aligned with a capacitive sensor that is mounted on the refrigerator, which is incompatible with the system of Proefke. If the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims prima facie obvious. *In re Ratti*, 270 F.2d 810, 123 USPQ 349 (CCPA 1959).

Claim 1 recites a method for detecting an open door of a refrigerator, the refrigerator including at least one door including a first door, at least one switch including a first switch configured to be activated by opening of the first door, and at least one detection circuit including at least one phase shift circuit coupled to an opto-coupler and a processor, the method including the steps of "receiving a signal from said first switch when said first switch is activated; phase-shifting the signal; feeding the phase-shifted signal to the opto-coupler; isolating the phase-shifted signal in the opto-coupler; monitoring an output signal from the processor; and comparing said output signal with a line signal to determine whether the first door is open."

None of Sigelman et al., Forsberg, and Proefke et al., considered alone or in combination, describe or suggest a method for detecting an open door as recited in Claim 1. Specifically, none of Sigelman et al., Forsberg, and Proefke et al., considered alone or in combination, describe or suggest isolating the phase-shifted signal in the opto-coupler. Rather, Sigelman et al. describe feeding waveforms B and C to a discriminator and feeding the output of the discriminator to a time delay circuit. Forsberg describes a

control for relay switch-on in a microwave oven, including an opto-coupler to provide feedback about the position of the relay contacts and optionally, door status. Proefke et al. describe a vehicle intrusion detection system that uses phase shift analysis of an airborne acoustic signal.

With particular reference to the rejection of Claim 9 in the present Office Action, Forsberg is cited as disclosing isolating the mixed signal using an opto-coupler, citing column 7, lines 52-61 which states:

"This electrical isolation demands an optical feedback of information about the position of the relay contacts from the relay 3 to the control unit 2. This optical feedback is shown in FIG. 6 by an optocoupler, which has been represented by the transmitting light emitting diode D_3 and the receiving phototransistor T_3 of the control unit 2. The circuit diagram also shows a so called door switch included in the current supply circuit of the high voltage transformer HVT, that is in the power current part of the microwave oven".

However, the preceding paragraph (col.7, lines 37-51) states:

"FIG. 6 shows a modified embodiment of the circuit diagram in FIG. 1 in which the control unit 2 of the microwave oven has been electrically isolated from the power current part of the microwave oven, that is the current supply via the mains terminals M_A, M_B, the relay 3, the high voltage transformer HVT, have been isolated from the electronic circuits including the microprocessor device 6 of the oven control system. The connection of the control unit 2 to the mains terminals illustrate nothing more than the fact that the control unit 2 has its current supply via the mains voltage, which may be obtained, for example, by means of a control voltage transformer comprised in the control unit and generating a low voltage current which is isolated from the mains".

Thus, it is clear that the phrase "[T]his electrical isolation" at col. 7, line 52, is not a reference to an action performed by the opto-coupler, but rather, is a reference to the state of other components, particularly the control unit, as being isolated from other parts of the system. There is no teaching or suggestion that the opto-coupler itself performs any isolation or mixing function on a received signal.

Accordingly, for the reasons set forth above, Claim 1 is submitted to be patentable over Sigelman et al. in view of Forsberg and further in view of Proefke et al.

Claims 2-11 depend from independent Claim 1. When the recitations of Claims 2-11 are considered in combination with the recitations of Claim 1, Applicants submit that dependent Claims 2-11 likewise are patentable over Sigelman et al. in view of Forsberg and further in view of Proefke et al.

For at least the reasons set forth above, Applicants respectfully request that the Section 103 rejection of Claims 1-12 be withdrawn.

The rejection of Claims 13-20 and 22-24 under 35 U.S.C. § 103(a) as being unpatentable over Sigelman et al. (U.S. Patent No. 4,691,195) in view of Proefke et al. (U.S. Patent No. 5,396,217) is respectfully traversed.

Sigelman et al. and Proefke et al. are described above.

Claim 13 recites an apparatus for detecting refrigerator door openings, the refrigerator including at least one switch configured to be activated by a door opening, the apparatus configured to "phase-shift a signal output by an activated switch; isolate the phase-shifted signal using an opto-coupler; determine whether a door is open using the shifted signal; and provide the shifted signal to a microcontroller."

Neither Sigelman et al. nor Proefke et al., considered alone or in combination, describe or suggest an apparatus for detecting refrigerator door openings as recited in Claim 13. Specifically, neither Sigelman et al. nor Proefke et al., considered alone or in combination, describe or suggest the apparatus configured to isolate the phase-shifted signal using an opto-coupler. Rather, Sigelman et al. describe feeding waveforms B and C to a discriminator and feeding the output of the discriminator to a time delay circuit. Proefke et al. describe a vehicle intrusion detection system that uses phase shift analysis of an airborne acoustic signal. Accordingly, for the reasons set forth above, Claim 13 is submitted to be patentable over Sigelman et al. in view of Proefke et al.

Claims 14-19 depend from independent Claim 13. When the recitations of Claims 14-19 are considered in combination with the recitations of Claim 13, Applicants

submit that dependent Claims 14-19 likewise are patentable over Sigelman et al. in view of Proefke et al.

Claim 20 recites an apparatus for detecting refrigerator door openings of a refrigerator, the refrigerator including a plurality of doors and corresponding switches configured to be activated by the refrigerator door openings, the apparatus configured to "phase-shift signals output by activated switches; determine whether the doors are open by using the phase-shifted signals; mix the phase-shifted signals output by the activated switches to generate a mixed signal; isolate the mixed signals using an opto-coupler; and supply the mixed signal to a processor.

Neither Sigelman et al. nor Proefke et al., considered alone or in combination, describe or suggest an apparatus for detecting refrigerator door openings as recited in Claim 20. Specifically, neither Sigelman et al. nor Proefke et al., considered alone or in combination, describe or suggest the apparatus configured to isolate the mixed signals using an opto-coupler. Rather, Sigelman et al. describe feeding waveforms B and C to a discriminator and feeding the output of the discriminator to a time delay circuit. Proefke et al. describe a vehicle intrusion detection system that uses phase shift analysis of an airborne acoustic signal. Accordingly, for the reasons set forth above, Claim 20 is submitted to be patentable over Sigelman et al. in view of Proefke et al.

Claims 22-24 depend from independent Claim 20. When the recitations of Claims 22-24 are considered in combination with the recitations of Claim 20, Applicants submit that dependent Claims 22-24 likewise are patentable over Sigelman et al. in view of Proefke et al.

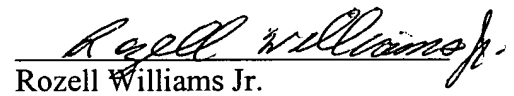
For at least the reasons set forth above, Applicants respectfully request that the Section 103 rejection of Claims 13-20 and 22-24 be withdrawn.

The rejection of Claim 21 under 35 U.S.C. § 103(a) as being unpatentable over Sigelman et al. in view of Proefke et al., and further in view of Forsberg is respectfully traversed.

Claim 21 has been canceled. Accordingly, Applicants respectfully request that the section 103 rejection of Claim 21 be withdrawn.

In view of the foregoing amendment and remarks, all the claims now active in this application are believed to be in condition for allowance. Reconsideration and favorable action is respectfully solicited.

Respectfully Submitted,



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